



9.30 VILLAGE OF TIVOLI

This section presents the jurisdictional annex for the Village of Tivoli.

9.30.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Joel R. Griffith, Mayor 86 Broadway, Tivoli, NY 845-757-2021 jrobertgriffith@yahoo.com	Robin Bruno, Deputy Mayor 86 Broadway, Tivoli, NY 845-235-2190 robintivoli1@aol.com

9.30.2 Municipal Profile

The Village of Tivoli is a community located in the northwestern corner of Dutchess County. The Village is bordered to the north, south and east by the Town of Red Hook and to the west by the Hudson River. According to the 2010 Census, the Village's population was 1,118. The Village has a total area of 1.8 square miles. Stony Creek flows through the Village and North Bay is located to the immediate south of the Village.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the map in Section 9.30.8 of this annex which illustrates the hazard areas along with the location of potential new development.

Table 9.30-1. Growth and Development

Property or Development Name	Type (e.g. Res., Comm.)	# of Units / Structures	Location (address and/or Parcel ID)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
Harrar two lot subdivision	residential	Subdivided one lot with two existing single family residences into two parcels	23 Broadway 134803-6175-04-672067-0000	none	Filed with Dutchess County Clerk
98 North Road	Residential	Single Family Residence built on vacant lot	98 North Road 134803-6175-04-672067-0000	none	Certificate of Occupancy issued
Known or Anticipated Development in the Next Five (5) Years					
Tivoli Waterfront Park	Municipal park	NA	Broadway 134803-6175-03-097051-0000	Flood hazard area	Planning stage
Sidewalk Access to Riverfront	Municipal responsibility	N/A	Along Broadway starting at Woods Road to Waterfront	Unknown	Planning stage

* Only location-specific hazard zones or vulnerabilities identified.



9.30.3 Natural Hazard Event History Specific to the Municipality

Dutchess County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this Plan, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.30-2. Hazard Event History

Dates of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
December 2008	Heavy rain	N/A	N/A	Surge tank 50,000 gallons floated out of ground. Tank had to be reinstalled and anchored.
August 26 – September 5, 2011	Hurricane Irene	DR-4020	Yes	The impacts of Hurricane Irene caused a culvert on Clay Hill Road to collapse resulting in one lane of the road to be closed. At Village Hall, the elevator pit flooded and caused damage to the hydraulic pump and caused mold to grow on the walls around the elevator. The shoreline near the treatment plant washed out and reconstruction of the shoreline was necessary. The Village had over \$19,000 in costs and damages to the municipality.
February 3, 2015	Heavy snow	N/A	N/A	Ballfield light pole fell on dugout. Required new pole lights and dugout repairs.
February 2015	Extreme cold	N/A	N/A	Water tower froze. DPW overtime, damaged distribution system valve, water main break.

9.30.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the hazard vulnerabilities and their ranking in the Village of Tivoli. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Village of Tivoli.

Table 9.30-3. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Coastal Storm	100-year MRP: \$153,178.00 500-year MRP: \$837,484.00 Annualized: \$10,081.00	Frequent	48	High
Drought	Damage estimate not available	Frequent	42	High



Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Earthquake	100-Year GBS: \$163,388 500-Year GBS: \$2,473,931 2,500-Year GBS: \$20,072,096	Occasional	32	High
Extreme Temperature	Damage estimate not available	Frequent	21	Medium
Flood	1% Annual Chance: \$0	Frequent	36	High
Severe Storm	100-Year MRP: \$153,178 500-year MRP: \$837,484 Annualized: \$10,081	Frequent	48	High
Winter Storm	1% GBS: \$2,224,664 5% GBS: \$11,123,320	Frequent	51	High
Wildfire	Estimated Value in the WUI: \$167,757,248	Frequent	48	High

Notes:

GBS = General building stock; MRP = Mean return period.

a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.

b. High = Total hazard priority risk ranking score of 31 and above

Medium = Total hazard priority risk ranking of 20-30+

Low = Total hazard risk ranking below 20

c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. The earthquake and hurricane wind hazards were evaluated by Census tract. The Census tracts do not exactly align with municipal boundaries; therefore, a total is reported for each Town inclusive of the Villages. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 2.2 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the wildfire hazard, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Village of Tivoli.

Table 9.30-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 100-year Boundary (3)
Village of Tivoli	2	2	\$16,562.22	0	0	2

Source: FEMA Region 2, 2014

(1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA Region 2, and are current as of 12/31/2014.

Please note the total number of repetitive loss properties does not include the severe repetitive loss properties. The number of claims represents claims closed by 12/31/14.

(2) Total building and content losses from the claims file provided by FEMA Region 2.

(3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Notes: FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

A zero percentage denotes less than 1/100th percentage and not zero damages or vulnerability as may be the case.

Number of policies and claims and claims total exclude properties located outside County boundary, based on provided latitude and longitude

Critical Facilities

The table below presents HAZUS-MH estimates of the damage and loss of use to critical facilities in the community as a result of a 1- and 0.2-percent annual chance flood events.

**Table 9.30-5. Potential Flood Losses to Critical Facilities**

Name	Type	Exposure		Potential Loss from 1% Flood Event		
		1% Event	0.2% Event	Percent Structure Damage	Percent Content Damage	Days to 100-Percent ⁽¹⁾
No critical facilities located in the FEMA 1% or 0.2% Flood Hazard Area.						

Source: Dutchess County, NYGIS

Note (1): HAZUS-MH 2.2 provides a general indication of the maximum restoration time for 100% operations. Clearly, a great deal of effort is needed to quickly restore essential facilities to full functionality; therefore this will be an indication of the maximum downtime (HAZUS-MH 2.1 User Manual).

Note (2): In some cases, a facility may be located in the DFIRM flood hazard boundary; however HAZUS did not calculate potential loss. This may be because the depth of flooding does not amount to any damages to the structure according to the depth damage function used in HAZUS for that facility type. Further, HAZUS-MH may estimate potential damage to a facility that is outside the DFIRM because the model generated a depth grid beyond the DFIRM boundaries.

X Facility located within the DFIRM boundary

- Not calculated by HAZUS-MH 2.2

Other Vulnerabilities Identified

The municipality has identified the following vulnerabilities within their community:

- Properties in the Tivoli Acres development along Lothrop Lane, Memorial Drive, Lisa Lane, Greentree Road, Elizabeth Drive and Madalin Court are prone to flooding following heavy rains. Neither Village Hall nor the Sewage Treatment Plant, both critical facilities, has back-up power.

9.30.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification
- National Flood Insurance Program
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Village of Tivoli.

Table 9.30-6. Planning and Regulatory Tools

Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No)	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes – 2005	Local	All municipal boards	Village of Tivoli Comprehensive Plan
Capital Improvements Plan	No	Local	Board of Trustees	Capital projects are funded as presented
Floodplain Management / Basin Plan	Yes – 2012	Local	Code Enforcement Officer	Chapter 122 (Flood Prevention Management) of Village Code
Stormwater Management	TBD			



Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No)	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Plan				
Open Space Plan	Yes – 2000	Local	All municipal boards	Town of Red Hook, Villages of Red Hook and Tivoli Open Space Plan
Stream Corridor Management Plan	TBD			
Watershed Management or Protection Plan	Yes	Local	All municipal boards	LWRP
Economic Development Plan	Yes	Local	Board of Trustees	LWRP
Comprehensive Emergency Management Plan	Yes	Local	Board of Trustees	Tivoli Fire Department
Emergency Response Plan	Yes	Local	Board of Trustees	Tivoli Fire Department
Post-Disaster Recovery Plan	No			
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	LWRP – 1991	Local, state, federal	Involved agencies under SEQR or lead agency when coordinated review; requires referral to Planning Board	Village of Tivoli Local Waterfront Revitalization Program
Regulatory Capability				
Building Code	Yes	State & Local	Code Enforcement Official	Chapter 98 (Building Code Administration) of Village Code
Zoning Ordinance	Yes – 1989 with subsequent amendments	Local	Planning Board, ZBA	Chapter 123 (Zoning) of Village Code
Subdivision Ordinance	Yes – 1998	Local	Planning Board	Chapter 198 (Subdivision of Land) of Village Code
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State, Local	Village	Chapter 122 (Flood Damage Prevention) of Village Code
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State, Local	Village	State mandated BFE+2 for single and two-family residential construction, BFE+1 for all other construction types
Growth Management Ordinances	Yes – 1989 with subsequent amendments	Local	Planning Board, ZBA	Chapter 123 (Zoning) of Village Code
Site Plan Review Requirements	Yes – 1989	Local	Planning Board	Chapter 231, Article IX of Village Code
Stormwater Management Ordinance	Yes	Local	Village DPW	Chapter 77 (Sewers) of Village Code
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	Yes	Local	Village	Open Space Ordinance (Chapter 198) and Greenway Conservation Program



Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No)	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
				(Chapter 134) of Village Code
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	Yes	State	Village	NYS mandate, Property Condition Disclosure Act, NY Code - Article 14 §460-467
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes – 1989	Local	Planning Board	Land Conservation District

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Village of Tivoli.

Table 9.30-7. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/ Agency/Position
Administrative Capability		
Planning Board	Yes	Appointed by the Village Board of Trustees
Mitigation Planning Committee	No	
Environmental Board/Commission	Yes	Planning & Zoning Board, Green Committee and Waterfront Committee
Open Space Board/Committee	Yes	Planning & Zoning Board, Green Committee and Waterfront Committee
Economic Development Commission/Committee	Yes	Board of Trustees
Maintenance Programs to Reduce Risk	No	Department of Public Works, Contract Engineer, Contract Planner
Mutual Aid Agreements	Yes	Tivoli Fire Department Chief
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	GREENPLAN, Inc (planner); Morris Associates (engineer)
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Morris Associates
Planners or engineers with an understanding of natural hazards	Yes	GREENPLAN, Inc (planner); Morris Associates (engineer)
NFIP Floodplain Administrator	Yes	Steve Cole, Code Enforcement Officer (shared services with the Town of Red Hook)
Surveyor(s)	Yes	Morris Associates
Personnel skilled or trained in GIS and/or HAZUS-MH applications	Yes	Contract Engineer and Contract Planner
Scientist familiar with natural hazards	Yes	Contract Engineer and Contract Planner
Emergency Manager	Yes	Village of Tivoli Fire Chief
Grant Writer(s)	Yes	Contract Engineer
Staff with expertise or training in benefit/cost analysis	Yes	Contract Engineer
Professionals trained in conducting damage assessments	Yes	Code Enforcement

Fiscal Capability

The table below summarizes financial resources available to the Village of Tivoli.



Table 9.30-8. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No)
Community development Block Grants (CDBG, CDBG-DR)	Yes; Board of Trustees
Capital Improvements Project Funding	Yes- Board of Trustees
Authority to Levy Taxes for specific purposes	Yes- Board of Trustees
User fees for water, sewer, gas or electric service	Yes, water and sewer; Board of Trustees
Impact Fees for homebuyers or developers of new development/homes	Yes, Recreation Fee; Board of Trustees
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	Hudson River Valley Greenway Grants; CHIPS; OPRHP grants; IDA grants
Open Space Acquisition Funding Programs	No
Other	No

Community Classifications

The table below summarizes classifications for community program available to the Village of Tivoli.

Table 9.30-9. Community Classifications

Program	Do you have this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	NP	NP
Building Code Effectiveness Grading Schedule (BCEGS)	No		
Public Protection (ISO Fire Protection Classes 1 to 10)	No		
Storm Ready	No	NP	NP
Firewise	No	NP	NP
Disaster/Safety Programs in/for Schools	No		
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	No		
Public-Private Partnerships	No		

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To be determined.

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The CRS class applies to flood insurance while the BCEGS and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when



the subject property is located beyond 1000 feet of a creditable fire hydrant and is within 5 road miles of a recognized Fire Station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Village of Tivoli's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.30-10. Self-Assessment Capability for the Municipality

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)*	Moderate	High
Planning and Regulatory Capability			X
Administrative and Technical Capability	X		
Fiscal Capability	X		
Community Political Capability			X
Community Resiliency Capability		X	
Capability to Integrate Mitigation into Municipal Processes and Activities.		X	

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Bob Fennell, Building Inspector

Flood Vulnerability Summary

The Village does not maintain lists/inventories of properties that have been damaged by floods. During Floyd, Irene, Sandy and other recent events, there were no structures damaged. The FPA did not make substantial damage estimates during these event. There is currently no interest in mitigation (acquisition or elevation).

Resources

The Village FPA is the sole person assuming the responsibilities of floodplain administration. NFIP administration services and functions provided by the FPA include: permit review, inspections, damage assessments, GIS, and education and outreach. The Village does not provide education or outreach to the community regarding flood hazards/risk or flood risk reduction. The FPA indicated that there are currently no barriers to running an effective floodplain management program and that he feels adequately supported and educated. If continuing education and/or certification training on floodplain management were offered, the FPA would consider attending.



Compliance History

The Village is currently in good standing with the NFIP. They have not had a compliance audit conducted.

Regulatory

The Village's floodplain management regulations/ordinances do not exceed the FEMA and state minimum requirements. There are programs within the Village that support floodplain management and include site plan review and variance requests.

Community Rating System

The Village of Tivoli does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

The Village of Tivoli currently has adopted a Comprehensive Plan (2005), Open Space Plan, and Local Waterfront Revitalization Plan. The 2005 Comprehensive Plan contains an inventory of steep slope areas and erodible soils, wetlands and floodprone areas. There are no significant recommendations to protect these areas beyond general statements to amend the Zoning Law to better protect lands adjacent to Stony Creek, which is a floodprone area in the Village. The Plan also encourages the use of conservation subdivision design to protect natural resources. The Comprehensive Plan does not refer to the Dutchess County HMP.

Additionally, the Village's Open Space Plan does not emphasize the management of areas at risk for natural hazards. The Local Waterfront Revitalization Plan identifies steep slopes and floodplains and includes various policies that address protecting these areas from development to minimize damage to natural resources and property.

Land Use Planning: The Town has a Planning Board and Zoning Board of Appeals which review all applications for development and consider natural hazard risk areas in their review. Many development activities require additional levels of environmental review, specifically NYS SEQR and Federal NEPA requirements.

Village of Tivoli Energy and Climate Action Plan 2012: The Village completed a plan which analyzed the climate change risks for the town and included recommendations for managing those risks. Some of the recommendations included the following:

- Buildings: work hard now to adopt energy efficiency and renewable energy measures to safeguard against possibly rising energy prices or shortages. - make air conditioning and Town/Village "cool spots" more widely available to cope with summer heat waves - strictly enforce building codes and land use regulations to minimize risk of damage to personal health or property in the event of disaster
- Agriculture: grow crop varieties better adapted to warmer conditions and longer growing seasons- upgrade and add irrigation systems to prepare for droughts- invest in cooling equipment for farms to preserve product, especially dairy - encourage purchase of locally grown food to a) build strong local



farms, and b) institute the behavior change early to ensure local food security in the event of widespread international food shortage/price increases due to drought and flood

- Smart Land Use: maximize ground cover of plant mass to minimize erosion in the event of floods - plant trees to maximize shade areas in several years - build permanent embankments around homes and other buildings vulnerable to flooding in the event of severe storms - apply “Ecosystem-based Approaches” which aim to increase ecosystem resilience and protect the critical ecosystem services on which humans depend, reducing vulnerability of human and natural systems to climate change. EbAs offer a good complement to more common strategies such as infrastructure development.
- Disaster Preparedness: work with existing Disaster Preparedness Committee to develop contingency plans and improve early warning systems for potential events. - prepare a contingency plan in the event of an influx of “climate refugees”/evacuees from coastal areas, including physical and mental health impacts on these individuals in addition to providing temporary housing, food, and water supplies.
- Community Institutions: build strong social institutions now for climate sensitivity, i.e. behaviors that support a sustainable community - work with residents to update insurance policies to safeguard against the effects of climate-induced disasters - foster strong and efficient mobilization of resources for adaptation measures, building a stable flow of financial and technical support to local actors.

Regulatory and Enforcement (Ordinances)

The Village's zoning and subdivision regulations, and/or site plan review process, consider natural hazard risk; however, the Village is in the process of amending its site plan regulations to place greater emphasis on preservation of floodplains, steep slopes and other areas of natural hazard risks. The Subdivision Regulations discuss the need to preserve “unusable” areas (i.e., floodprone areas, steep slopes); however these regulations should be amended to give greater emphasis to the risk for natural hazards associated with these lands.

Data, information, tools and resources used by the Village's Planning and Zoning Boards to guide their decisions with respect to natural hazard risk management include the following: State Environmental Quality Review (SEQR); NYSDEC environmental resource mapper; Dutchess County Soil Survey; FEMA 100-year Floodplain maps; maps showing development constraints (steep slopes, FEMA floodplains, DEC and NWI wetlands, streams and lakes) in the Village based on information from DC Planning Department; a map showing the location of aquifers based on data provided by Dutchess Environmental Management Council; information on natural resources found in the Community Preservation Project Plan, etc. The Village indicated that it would be beneficial if employees were trained in GIS. Refer to mitigation action Tivoli-1 in Table 9.30-11.

The Subdivision Regulations require some of these actions, however the regulations need to be updated. For example, drainage requirements are out of date (storm drainage easements along watercourses etc. are only required to be the width sufficient to accommodate runoff during the 25-year storm event); submission of a resource analysis map should be required as part of Sketch Plat (only topography is currently required) etc.

The following provides information on the ordinances within the Village that pertain to hazard mitigation:

Flood Damage Prevention Chapter 122: It is the purpose of this chapter to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:



- A. Regulate uses which are dangerous to health, safety and property due to water or erosion hazards or which result in damaging increases in erosion or in flood heights or velocities;
- B. Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- C. Control the alteration of natural floodplains, stream channels, and natural protective barriers which are involved in the accommodation of floodwaters;
- D. Control filling, grading, dredging and other development which may increase erosion or flood damages;
- E. Regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands; and
- F. Qualify for and maintain participation in the National Flood Insurance Program.

Zoning Code Chapter 231: The Town's zoning code includes districts and standards pertaining to the mitigation of hazards. These sections include the Floodplain regulations, stormwater management & erosion control standards.

Site Plan/Subdivision Review Chapter 198: The Town's Planning Board is tasked with site plan/subdivision review. The Planning board pays special attention to ensure that developments mitigate the issues associated with flooding or steep slopes.

Building Code Chapter 102: The building codes are strictly enforced to make new and renovated buildings as prepared as possible for hazard related incidents. The chapter includes a provision to allow the building inspector to make emergency repairs to protect the health safety and welfare of the residents.

Operational and Administration

GREENPLAN, Inc. provides professional planning services to the Village. GREENPLAN reviews development projects at the request of the Planning Board, and advises the Board of Trustees about sections of the Village Code that should be updated.

The Village of Tivoli has a Planning Board and Zoning Board of Appeals. Both boards consider impacts to natural resources during the review of development applications and, in the case of the ZBA, requests for variances and interpretations. These boards review applications for consistency with the recommendations of the Comprehensive Plan, the Greenway Guides, and the LWRP, as does the Board of Trustees when it takes actions. The potential for significant adverse environmental impacts of all Unlisted and Type I actions are reviewed under SEQR.

Currently, Village staff does not receive training or continuing professional education which supports natural hazard risk reduction. Additionally, the Village does not have any other hazard management programs in place. There are no job descriptions within the Village that specifically include identifying and/or implementing mitigation projects/actions or other efforts to reduce natural hazard risk. Refer to mitigation action Tivoli-2 in Table 9.30-11.

Funding

Operating Budget: The Town's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster. The operating budget contains a line item for mitigation projects/activities and includes contract engineer, contract planner, and code enforcement officer.



Education and Outreach

The Village's website includes news briefs and announcements on the home page. It also has an emergency services web page with contact information for emergency personnel. The Planning Department is a member of the Dutchess County Planning Federation and attends trainings and researches best practices that other communities are implementing. The Village has planned to budget for training for personal including professional development geared towards health and safety.



9.30.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The Village of Tivoli has no prior mitigation strategy.

Completed Mitigation Initiatives

The Village has not identified any mitigation projects/activities that have been completed within their community.

Proposed Hazard Mitigation Initiatives for the Plan

The Village of Tivoli participated in a mitigation action workshop in May 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013).

Table 9.30-11 summarizes the comprehensive-range of specific mitigation initiatives the Village of Tivoli would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this Plan. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High', 'Medium', or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.30-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan.



Table 9.30-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Tivoli-1	Provide GIS training to Village personnel to support hazard mitigation within the community.	N/A	All	All	Village	Medium – Improved understanding of and ability to manage natural hazard risk	Medium	Grant funding	Short term/DOF	Medium	LPR	PR
Tivoli-2	Promote and support non-structural flood hazard mitigation alternatives for flood vulnerable properties, including those that have the potential to be identified as Repetitive Loss, such as floodproofing, acquisition/relocation or elevation depending on feasibility. The parameters for this initiative would be: funding, benefits versus cost and willing participation of property owners. Specifically identified are properties in the following locations: <ul style="list-style-type: none"> Lasher Road 											
	See above.	Existing	Flooding, Severe Storm	2, 3	Municipal NFIP FPA; support from NYS DHSES and FEMA	High - Reduced or eliminated risk to property damage from flooding	High	FEMA or other mitigation grant funding, NFIP flood insurance and ICC; property owner for local match.	Long-term DOF	High	SIP, EAP	PP, PI
Tivoli-3	Conduct a preliminary evaluation of the flooding and drainage issues at Tivoli Acres. After evaluation, perform a drainage analysis of the drainage area.	Existing	Flooding	1, 2	Village	High - Reduced or eliminated risk to property damage from flooding	Low	Grant funding	Short term	High	LPR	PR,PP,SP
Tivoli-4	Obtain properties upstream of Tivoli Acres and design/construct a series of stormwater ponds with fore bays.	Existing	Flooding	1, 2	Village	High - Reduced or eliminated risk to property damage from flooding	High	FEMA or other mitigation grant funding,	Long term	Medium	SP, NSP	PP, NR, SP
Tivoli-5	Public outreach/education initiative under which the Village will use available outreach	N/A	All	All	Various	Medium – Improved understanding	Low	Various	Short term / DOF	Medium	EAP	PI



Table 9.30-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
	means (Village website, social media, etc.) to inform residents of local, County and regionally-supported informational seminars and workshops to help residents understand how they can manage their personal risk, through preparedness, flood insurance, and opportunities to mitigate their properties.					of and ability to manage natural hazard risk						

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CAV	Community Assistance Visit
CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
RFC	Repetitive Flood Claims Grant Program (discontinued in 2015)
SRL	Severe Repetitive Loss Grant Program (discontinued in 2015)

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk





Costs:

project would have to be spread over multiple years.

High Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

exposure to property.

High Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- *Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.*
- *Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.*
- *Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.*
- *Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities*

CRS Category:

- *Preventative Measures (PR) - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.*
- *Property Protection (PP) - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.*
- *Public Information (PI) - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.*
- *Natural Resource Protection (NR) - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.*
- *Structural Flood Control Projects (SP) - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.*
- *Emergency Services (ES) - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities*



Table 9.30-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Tivoli-1	Provide GIS training to Village personnel to support hazard mitigation within the community.	0	0	1	0	1	0	1	1	1	1	1	1	1	1	10	high
Tivoli-2	Promote and support non-structural flood hazard mitigation alternatives for flood vulnerable properties, including those that have the potential to be identified as Repetitive Loss	0	1	1	0	0	1	0	1	0	1	1	1	1	0	8	high
Tivoli-3	Conduct a preliminary evaluation of the flooding and drainage issues at Tivoli Acres. After evaluation, perform a drainage analysis of the drainage area.	1	1	1	0	1	1	0	1	1	1	1	1	1	1	12	high
Tivoli-4	Obtain properties upstream of Tivoli Acres and design/construct a series of stormwater ponds with fore bays.	-1	1	-1	0	-1	0	-1	-1	0	-1	0	0	-1		-6	low
Tivoli-5	Public outreach / education initiative	0	0	1	0	1	1	0	1	1	1	1	1	1	1	10	high

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.30.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.30.8 Hazard Area Extent and Location

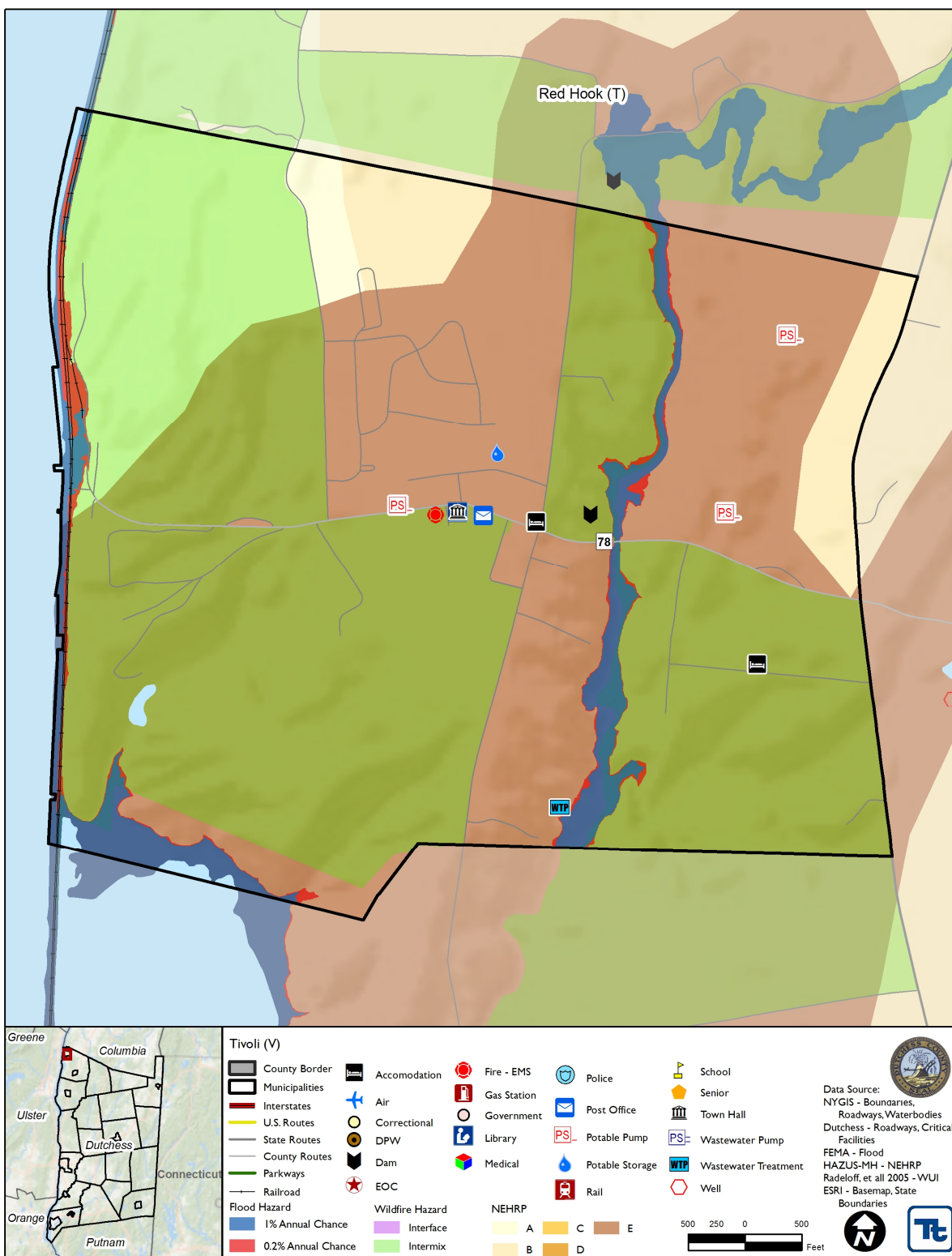
Hazard area extent and location maps have been generated for the Village of Tivoli that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Village of Tivoli has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.30.9 Additional Comments

None at this time.



Figure 9.30-1. Village of Tivoli Hazard Area Extent and Location Map





Action Number:

Tivoli-3

Action Name:

Preliminary evaluation of the flooding and drainage issues at Tivoli Acres.

Assessing the Risk	
Hazard(s) addressed:	Flood
Specific problem being mitigated:	Drainage issues at Tivoli Acres
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	Conduct a preliminary evaluation of the flooding and drainage issues at
	1. Tivoli Acres. After evaluation, perform a drainage analysis of the drainage area.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Conduct a preliminary evaluation of the flooding and drainage issues at Tivoli Acres. After evaluation, perform a drainage analysis of the drainage area.
Mitigation Action/Project Type	LPR, SIP
Goals Met	1, 2
Applies to existing structures/infrastructure, future, or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Low
Priority*	High
Plan for Implementation	
Responsible Organization	Village Administration
Local Planning Mechanism	Capital Improvement, Stormwater
Potential Funding Sources	Grant Funding
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

* Refer to results of Prioritization (see next page)



Action Number:

Tivoli-3

Action Name:

Preliminary evaluation of the flooding and drainage issues at Tivoli Acres.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect residents from flood damage
Property Protection	1	Protect property from flood damage
Cost-Effectiveness	1	
Technical	0	
Political	1	
Legal	1	
Fiscal	0	
Environmental	1	
Social	1	
Administrative	1	
Multi-Hazard	1	
Timeline	1	
Agency Champion	1	
Other Community Objectives	1	
Total	12	
Priority (High/Med/Low)	High	